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EXAMINER	
WARREN, MATTHEW E	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

DETAILED ACTION

The Board of Appeals and Interferences Remanded the Appellant's Appeal Brief to the Examiner to rebut arguments made in the Reply Brief filed on November 14, 2003 and concerning claims 32-35. This Supplemental Examiner's Answer is in response to those arguments submitted in that Reply Brief.

In re Claims 32 and 33

The appellant alleged that the examiner did not respond to the arguments concerning claims 32 and 33. In the Examiner's Answer mailed on September 9, 2003, the examiner rebutted arguments pertaining to claims 32 and 33 and the rejection of the claims over Farrar in view of Otsuka on page 12. On that page the examiner stated specifically how the two references combined to show all of the elements of the claims. With respect to the final argument that Farrar and Otsuka do not show all of the elements of the claims, the examiner believes that Otsuka cures the deficiency of Farrar and shows motivation for combining. Farrar, disclosing the various wiring levels each having conductive cores and liners, was only deficient in disclosing dielectric pillars formed in the wiring lower level. Otsuka was cited to show that dielectric pillars were formed in a wiring level to improve the structural integrity. Since semiconductors often have many wiring levels, and each wiring level essentially consists of the same structures, one of ordinary skill would find that the dielectric pillars of Otsuka's wiring level would be also useful in a lower wiring level. Furthermore, as seen in figure 13C of Otsuka, the dielectric pillars (P) are formed next to conductive wiring material (10).

Therefore one of ordinary skill in the art, wishing to improve the structural integrity of the lower wiring level would add the dielectric pillars of Otsuka and form them next to the wiring levels having a core and a liner of Farrar. When the references are combined, the lower conductive liner of Farrar would be on the side of one or more dielectric pillars of Otsuka. Therefore, Otsuka cures the deficiency of Farrar and shows motivation for the improvement.

In re claims 34 and 35

The appellant alleged that the examiner did not respond to the arguments concerning claims 34 and 35. In the Examiner's Answer mailed on September 9, 2003, the examiner rebutted arguments pertaining to claims 34 and 35 and the rejection of the claims over Farrar in view of Otsuka and Havemann in the paragraphs pertaining to Farrar and Havemann on page 10 and 11 and the paragraphs pertaining to Farrar and Otsuka on page 12. The appellant made the same arguments against those references and pertaining to previously argued claims. With respect to the final argument that Farrar and Otsuka do not show all of the elements of the claims, the examiner believes that Otsuka cures the deficiency of Farrar and shows motivation for combining. Farrar, disclosing the various wiring levels each having conductive cores and liners, was only deficient in disclosing dielectric pillars formed in the wiring lower level. Otsuka was cited to show that dielectric pillars were formed in a wiring level to improve the structural integrity. Since semiconductors often have many wiring levels, and each wiring level essentially consists of the same structures, one of ordinary skill would find that the

dielectric pillars of Otsuka's wiring level would be also useful in a lower wiring level. Furthermore, as seen in figure 13C of Otsuka, the dielectric pillars (P) are formed next to conductive wiring material (10). Therefore one of ordinary skill in the art, wishing to improve the structural integrity of the lower wiring level would add the dielectric pillars of Otsuka and form them next to the wiring levels having a core and a liner of Farrar. When the references are combined, the lower conductive liner of Farrar would be on the side of one or more dielectric pillars of Otsuka.

With respect to the arguments against Havemann, the applicant argues that the upper liner (48) of Havemann cannot be conductive because it is listed as a silicon nitride (col. 4, lines 65-67). The examiner believes that the liner (48) may be conductive because the purpose of forming the upper level is to be a conductor groove (col. 4, lines 55-64). If the groove is to be conductive then everything within it must be conductive including the liner (48) and the core (52). Furthermore, Havemann calls liner (48) an encapsulation layer in the same way lower liner (36) is labeled a via encapsulation layer (col. 4, lines 37-40) having titanium nitride, which is known to be conductive. It seems that if liner layer (48) is non-conductive, then the via which it forms cannot make electrical contact with the lower via. Although silicon nitride is listed only as an example of the upper liner layer (48) there is nothing else in the text of Havemann to indicate that the layer is non-conductive. Therefore, it is assumed that upper liner layer is conductive and forms the appropriate liner-to-liner contact region as stated in the claims. Even if the upper liner (48) of Havemann were non-conductive, Farrar already discloses an upper liner of conductive material. One would only look to Havemann to obtain the

structure of the liner-to-liner contact region or a portion of the upper level conductor extending below a top surface of the lower level conductor. Havemann discloses that such a configuration forms vias without deleterious mechanical effects (last line of the abstract).

With respect to the appellant's argument that the motivation to combine (which was taken from Havemann) is improper, the examiner believes that the motivation is proper and that the appellant's interpretation of the language is incorrect. The appellant continuously harps on the fact that the examiner stated that a "contact is formed without mechanical defects." The appellant then pointed out the Havemann only states that "Methods are shown for realizing desirable insulating and conducting layers without deleterious mechanical effects." It is true that the examiner took the liberty of paraphrasing the statement in the last line of Havemann's abstract, however the meaning of both phrases are the same. The meaning of "deleterious" taken from Merriam Webster's Collegiate Dictionary (10^{th} Edition) is "harmful often in a subtle or unexpected way." Therefore, if one were to understand the meaning of the phrase "without deleterious mechanical effects" if would be understood to mean "without harmful mechanical effects." Loosely interpreted, that statement means that the structure is formed without mechanical defects. Even if one were not to interpret that statement in such a way, one would still gather motivation from the phrase by realizing that the structure is a desirable contact without harmful mechanical effects. In essence, the appellant's argument is irrelevant because motivation has been taught in the Havemann reference.

All arguments pertaining to the claims and the references have been rebutted and for these reasons, it is believed that the rejections should be sustained.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Warren whose telephone number is (571) 272-1737. The examiner can normally be reached on Mon-Thur and alternating Fri 9:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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MEW
July 11, 2005

Tom Thomas
TOM THOMAS
SUPERVISORY PATENT EXAMINER